



India's First 5.56 km Free-Space Quantum Key Distribution Link Demonstrated

Posted On: 03 OCT 2026 4:44PM by PIB Delhi

QNu Labs, in collaboration with Bhaskaracharya National Institute for Space Applications and Geo-informatics (BISAG-N) and IIT Gandhinagar, has successfully demonstrated India's first free-space Quantum Key Distribution (QKD) link at a scale of 5.56 km.

The field trial, conducted on the night of September 27–28, established a secure quantum communication channel between BISAG-N and IIT Gandhinagar. Using QNu Labs' Pointing, Acquisition and Tracking system, the trial achieved a stable Quantum Bit Error Rate below 5% and generated secure keys at a rate of 230–260 bps. These keys were integrated with BISAG-N's post-quantum cryptography enabled Vedic Kavach platform, enabling successful end-to-end encryption and decryption of test messages.

The demonstration combined two complementary layers of quantum security: QNu Labs' hardware-based QKD device Armos over free-space optical channels and BISAG-N's Vedic Kavach software-based post-quantum cryptography with quantum random number generation. This integrated architecture ensures resilience even if the physical quantum channel is temporarily unavailable.

Dr. Vinay Thakur, Director General, BISAG-N, stated that the integration of Vedic Kavach with QNu Labs' QKD technology marks a significant step towards practical quantum-resilient communication systems.

Sunil Gupta, Co-founder and CEO, QNu Labs, emphasized that the successful 5.56 km demonstration paves the way for longer-distance quantum-secure networks and satellite-based quantum communication.

Comde Manish Tripathi (Retd.), In-charge, ISTF, IIT Gandhinagar, added that the demonstration provides a valuable field environment for advancing practical quantum communication technologies and showcases how academia, indigenous technology and real-world experimentation can be integrated to meet emerging secure communication requirements.

The trial provides a foundation for advancing India's capabilities in secure communication infrastructure, strengthening resilience against emerging quantum-era security threats.

About BISAG-N: An autonomous scientific society under MeitY, BISAG-N works in space technology applications, satellite communication, geo-informatics and supports technology-driven governance.

About IIT Gandhinagar: Founded in 2008, the Indian Institute of Technology Gandhinagar (IITGN) is a leading institution focused on excellence in engineering, science, technology, humanities and social sciences. The Institute promotes interdisciplinary research, innovative education and solutions to real-world challenges.

About QNu Labs: Founded in 2016, QNu Labs is India's pioneer in quantum-secure digital infrastructure, offering sovereign products and solutions deployed globally.

Vinod Kumar / Dhanya Ranjan / Kanishk Sharma

(Release ID: 2318656) Visitor Counter : 1111

Read this release in: Urdu , हिन्दी , Marathi , Telugu